

# B R E V I O R A

Museum of Comparative Zoology

US ISSN 0006-9698

JAN 23 1995

CAMBRIDGE, MASS.

10 JANUARY 1995

NUMBER 501

HARVARD  
UNIVERSITY

## A NEW LIZARD OF THE GENUS *MACROPHOLIDUS* (TEIIDAE) FROM A RELICTUAL HUMID FOREST OF NORTHWESTERN PERU, AND NOTES ON *MACROPHOLIDUS RUTHVENI* NOBLE

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**ABSTRACT.** *Macropholidus ataktolepis*, new species, is a microteiid lizard known only from the type locality, Bosque Cachil, in the western Andes of extreme southwestern Cajamarca Department, Peru. It differs from the only other species of the genus, *Macropholidus ruthveni* Noble, in having prefrontal scales and in having the paired series of enlarged dorsal scales disrupted at or before midbody, rather than continuing to the tail. In addition, taxonomic data and natural history observations for *M. ruthveni* are summarized, including data for a large sample from the Rio Zaña valley of northwestern Peru (Cajamarca Department).

**RESUMEN.** *Macropholidus ataktolepis*, nueva especie, es un microtéido conocido solamente en la localidad típica, Bosque Cachil, en los Andes occidentales del extremo suroeste del departamento de Cajamarca, Perú. La nueva especie difiere de *Macropholidus ruthveni* Noble, la única otra especie del género, por tener escamas prefrontales y tener la serie pareada de escamas dorsales agrandadas disruptidas hasta o antes de la mitad del cuerpo, antes que continuar hasta la cola. Además, se resumen datos taxonómicos y observaciones de la historia natural para *M. ruthveni*, incluyendo datos para una muestra grande de esa especie procedente del valle del Río Zaña al noroeste del Perú (Departamento de Cajamarca).

### INTRODUCTION

As a result of recent explorations, the Andean slopes of northwestern Peru continue to yield many new species of amphibians and reptiles (Cadle, 1989, 1991; Cadle and McDiarmid, 1990; Duellman and Wild, 1993). In addition, distributions of species

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previously known from few localities in this region are being refined. Most of the new discoveries have come from remnants of mesic to humid forests that occur in scattered patches on the western slope of the Andes from the Ecuadorian border to central Peru (H. W. Koepcke, 1957, 1961; H. W. Koepcke and M. Koepcke, 1958; M. Koepcke, 1954). These forests are thus islands in the sea of arid mountainous terrain characteristic of this portion of western South America. This paper describes a small lizard recently discovered in one such forest remnant and provides additional data on its presumed closest relative, *Macropholidus ruthveni* Noble. *Macropholidus ruthveni* proved to be common at Bosque Monte Seco, another forest isolate in the Rio Zaña valley just north of the type locality of the new species and from which other species of frogs, lizards, and snakes have been recently described (Cadle, 1989, 1991; Cadle and McDiarmid, 1990).

Noble (1921a) erected the genus *Macropholidus* for a species of microteiid lizard (type species, *M. ruthveni*) from the "cordillera forming the boundary between the Departments of Piura and Cajamarca [Peru]." He compared *Macropholidus* only to *Pholidobolus*, a genus of the Ecuadorian Andes, from which *Macropholidus* was distinguished by (1) its possession of two enlarged, smooth, hexagonal rows of medial dorsal scales, the character that provided the etymology for the generic name, and (2) the lack of reduced scales laterally on the body. *Macropholidus ruthveni* has, until now, been known from only the four specimens in the type series. Subsequently, Parker (1930) described *Macropholidus annectens* from the vicinity of Loja City, Ecuador, and noted that this species shared scutellational characters with both *Macropholidus* and *Pholidobolus*. In particular, *M. annectens* lacked the enlarged dorsals characteristic of *M. ruthveni* but, instead, had dorsal scales similar to some species of *Pholidobolus*. Montanucci (1973) transferred *annectens* to *Pholidobolus* but retained *Macropholidus* as a monotypic genus characterized by the enlarged dorsals, a feature not seen in *Pholidobolus* (Montanucci, 1973:5). Other than Montanucci's brief discussion, *Macropholidus* has rarely been mentioned in the literature subsequent to Parker's description of *annectens*. Some workers (e.g., Presch, 1980) treated the two genera as synonymous based on a consideration of *annectens*, which is much better known than *ruthveni*,

the type species of *Macropholidus*. The new species described herein has the enlarged dorsals characteristic of *Macropholidus*, but they do not form as extensive a series as in the type species, *M. ruthveni*.

## MATERIALS AND METHODS

The type series of the new species consists of nine specimens. The type series ( $N = 4$ ) of *Macropholidus ruthveni* was also examined, as well as a series ( $N = 24$ ) of that species recently collected by the senior author from the Rio Zaña valley, southwestern Cajamarca Department, Peru, and one other specimen referred to *ruthveni* from a locality (Lima Department) far south of the other known localities for that species. Details on these samples are given in the section on *ruthveni*, later.

Snout-vent length (SVL; the straight line distance from the tip of the snout to the vent) and tail length (TL; vent to tip of tail, regenerated portion separated by a + sign) were measured to the nearest 0.5 mm with a metric ruler. All other measurements were taken to the nearest 0.1 mm with dial calipers: head length (HL; tip of snout to posterior margin of ear), maximum head width (HW) and depth (HD), and body length (BL; posterior margin of arm to anterior margin of leg).

The terminology of scales in lizards generally is difficult to standardize; we used Peters (1964) and Smith (1946:17–30) as guides herein. Most of the potentially confusing scale terminology concerns the circumorbital series and the series of scales on the ventral surface of the head. Definitions used herein are the following: *Superciliaries* include scales contacting the supraorbitals and at least one-half of whose area is dorsal to the orbit. *Genials* are large paired scales posterior to the postmental, in contact on the midline and contacting the infralabials laterally. *Postgenials* are enlarged scales posterior to the genials, in contact laterally with the infralabials and not in contact medially. *Gulars* are scales enclosed by the genial–postgenial series anteriorly and the gular fold posteriorly; in *Macropholidus*, the gular series includes a paired series of enlarged medial gular scales extending anteriorly from the gular fold as well as smaller scales between the enlarged series and the genial–postgenial series. *Dorsals* are considered to be all scales on the trunk except for the squarish ventral plates;



this definition includes "laterals" as defined by Smith (1946:27). In *Macropholidus*, the middorsal pair of dorsal scales is considerably enlarged (*medial dorsals*). *Paradorsals* are a pair of scale rows, somewhat larger than other dorsals, that border the medial dorsal rows.

Transverse dorsal scale rows were counted from the occipitals to the posterior margin of the hindlimb. Transverse ventrals were counted between the limbs (axilla to groin). Counts of subdigital lamellae included the terminal claw sheath.

Museum abbreviations for specimens referred to are Academy of Natural Sciences of Philadelphia (ANSP), American Museum of Natural History, New York (AMNH), Field Museum of Natural History, Chicago (FMNH), University of Kansas Museum of Natural History (KU), and Museum of Comparative Zoology, Harvard University (MCZ). Specimens of *Macropholidus ruthveni* referred to only by J. E. Cadle field numbers (JEC) will be deposited in the Museo de Historia Natural de San Marcos, Lima.

## DESCRIPTION

### *Macropholidus ataktolepis*, new species

Figures 1, 3, 4

*Holotype* (Figs. 1, 3, 4). MCZ 178050 (field number JEC 10320), an adult female collected by Pablo Chuna Mogollon, 28 September 1991, at Bosque Cachil, approximately 3 km (airline) SE Contumazá, 2,400 m, Cajamarca Department, Peru (07°23'S, 78°47'W; Fig. 2).

The type locality (Fig. 2) is the site of ongoing biological surveys by Abundio Sagástegui, Pablo Chuna, and their colleagues of the Universidad Antenor Orrego, Trujillo, Peru. It lies in a small montane valley near the main road between Cascas and Contumazá in extreme southwestern Cajamarca Department.

*Paratopotypes*. The following eight specimens, all collected at the type locality: MCZ 178038–39 collected 27 July 1993 by P. Chuna M., P. Lezana, and S. Leiva; MCZ 178045–46 collected 17 May 1993 by P. Chuna M. and P. Lezana; and MCZ 178264–67 collected 12 December 1993 by P. Chuna M.

*Etymology*. The species name, a noun in apposition derived from the Greek *ataktos* (disordered, irregular, not arranged) +



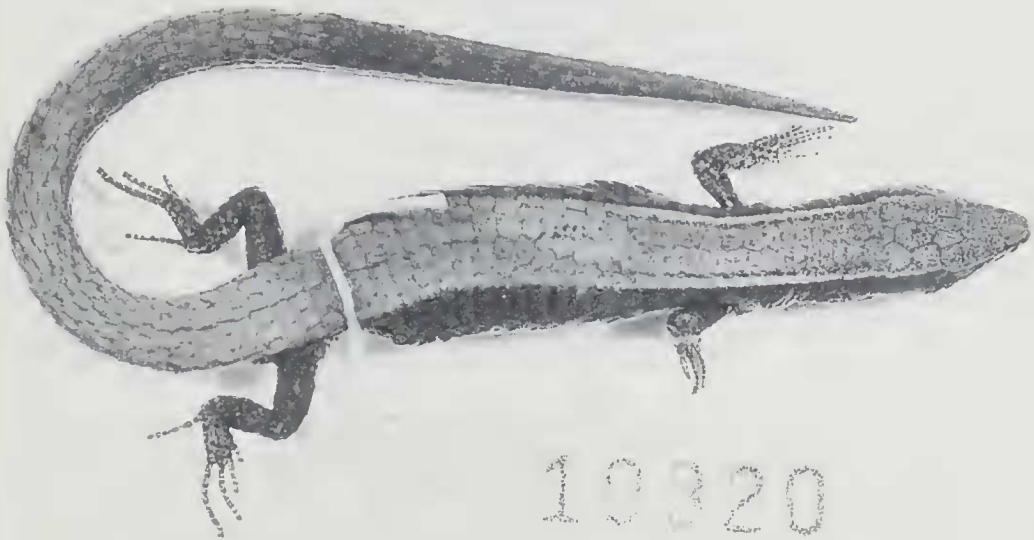


Figure 1. The female holotype of *Macropholidus ataktolepis* (MCZ 178050) in dorsal view.

*lepis* (scale), alludes to the disruption of the orderly array of enlarged dorsal rows in this species, as compared to the completely regular series in the type species of the genus.

*Diagnosis.* *Macropholidus ataktolepis* differs from the only other species of the genus, *M. ruthveni*, in having (1) a pair of prefrontal scales (absent in *ruthveni*); (2) the paired series of enlarged middorsal scale rows continuous only on the anterior part of the body (continuous to, or nearly to, the tail base in *ruthveni*); and (3) a regular arrangement of four enlarged temporal scales (irregular in number [1–7] and arrangement in *ruthveni*). *Macropholidus ataktolepis* differs from *Pholidobolus* (formerly *Macropholidus*) *annectens* (Parker) in having prefrontal scales and a double row of enlarged medial dorsal scales on the anterior part of the body. No species of *Pholidobolus*, as currently defined (Montanucci, 1973), has a double row of enlarged medial dorsals (see additional comments later).

*Description (Type Series).* The type series comprises the female holotype (38.5 mm SVL) and the following paratypes: four males (MCZ 178038–39, 178265–66; 29–35 mm SVL); two females (MCZ 178045, 178264; 39–43 mm SVL); and two juveniles (MCZ

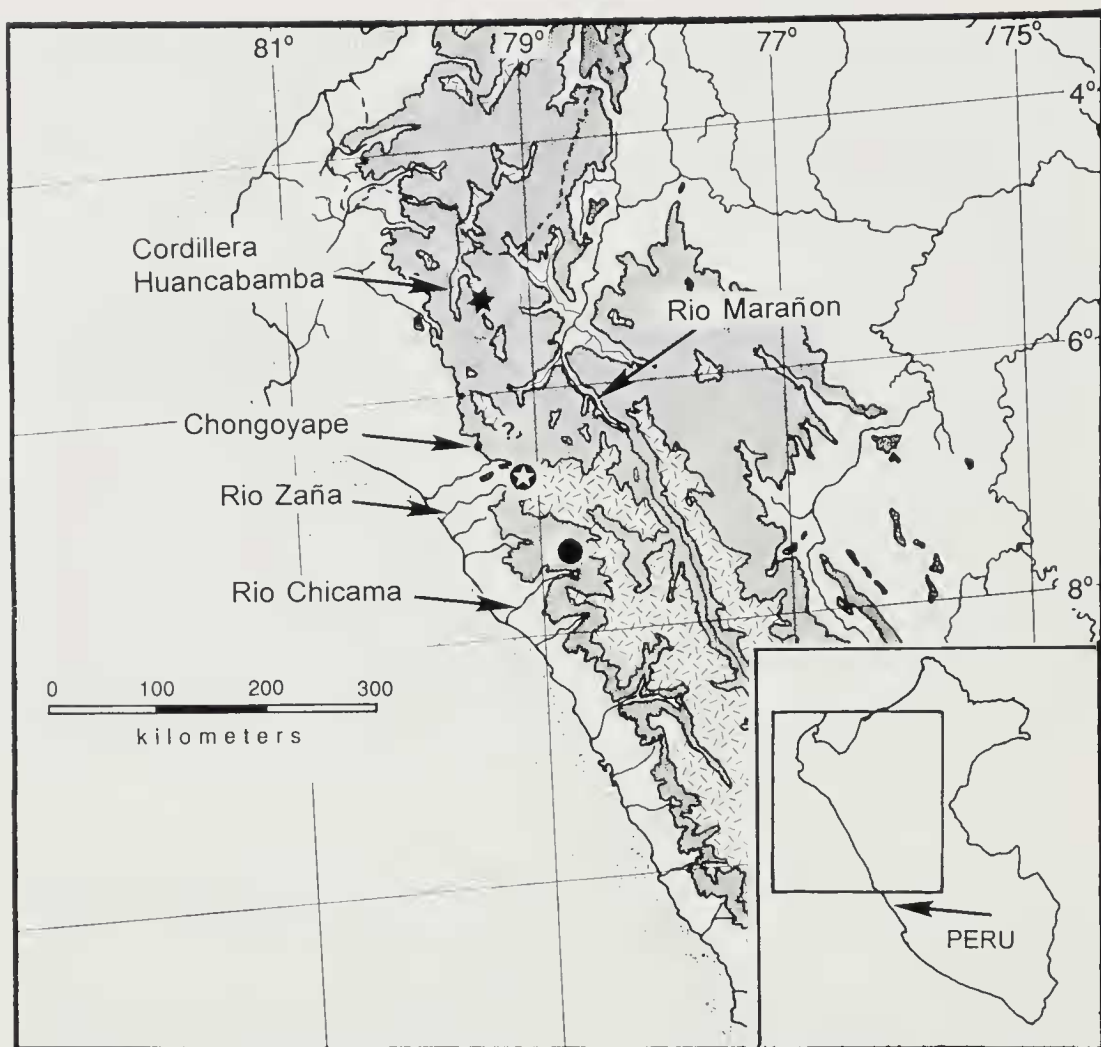


Figure 2. The Andes of northwestern Peru showing distributions of species of *Macropholidus*, place names, and physical features. Stippled area is above 1,000 m; hatched area is above 3,000 m. Star marks the type locality of *M. ruthveni*. Star within circle is the other known locality for *M. ruthveni*, Bosque Monte Seco (Cajamarca Department). Dot marks the type locality for *M. ataktolepis*, Bosque Cachil (Cajamarca Department). The question mark in northern Peru denotes the possible approximate locality for the "Chongollapi" paratypes of *ruthveni* (see text). The arrow within the inset map shows the location of Chaclacayo (Lima Department), from which comes an enigmatic specimen provisionally referred to *M. ruthveni* (KU 220845; see text).

178046, 178267; 19.5–22 mm SVL). Thus, adult females attain a larger size than adult males. Measurements and scale counts of the holotype are given in Table 1, and meristics and proportional data are given for the series in Table 2.

HL 21–24% SVL in adults (28% in juveniles), 1.5–1.9 times longer than wide, 1.3–1.7 times wider than high. Head slightly

TABLE 1. MEASUREMENTS (IN MILLIMETERS) AND SCALE COUNTS FOR THE HOLOTYPE OF *MACROPHOLIDUS ATAKTOLEPIS* AND *MACROPHOLIDUS RUTHVENI*.

	<i>ataktolepis</i> Holotype, MCZ 178050, Female	<i>ruthveni</i> Holotype, MCZ 14041, Female
Snout-vent length	38.5	45.5
Tail length	32 + 24	34 + 37
Head length	8.2	9.6
Head width	4.8	5.5
Head depth	3.2	3.4
Body length	20.3	26.1
Scales around midbody	19	19
Subdigital lamellae, finger IV	13, 14	16, 16
Subdigital lamellae, toe IV	16, 16	19, 18
Total transverse dorsal rows	31	33
Total enlarged medial dorsal pairs	15	30
Transverse ventrals between limbs	21	21

wider than neck, which is as wide as anterior body. Body cylindrical, slightly depressed. Complete tail in adults greater than twice SVL (2.1 times SVL in MCZ 178045 with tail tip missing, 2.4 times SVL in MCZ 178038 with complete tail); 68% and 70% of total length in these two specimens, respectively. Tail squarish to oval in cross section at base, tapering toward tip. Limbs pentadactyl, with well-developed digits; all digits with terminal claws. Forelimb extended forward along neck and head reaches posterior border of eye, or slightly anterior to this. Tongue (examined in MCZ 178045) lanceolate, covered with thin, scale-like papillae arranged in oblique rows, tip bifid; 8/8 heavily pigmented infralingual plicae. Anterior teeth conical, posterior teeth laterally compressed, tricuspid.

*Head.* Head short, depressed (depth 58–79% of width); snout blunt (Figs. 1, 3). Rostral wider than deep, visible from above, laterally in contact with first supralabial and anterior nasal, dorsally in contact with frontonasal. Frontonasal pentagonal, with slightly curved anterior border and obtusely pointed posterior border, separating nasals; posterolaterally narrowly contacting loreal (MCZ 178039, 178045–46, 178050, 178264–67) or narrowly separated from it by prefrontal–posterior nasal contact (MCZ



TABLE 2. SCALE COUNTS, MEASUREMENTS, AND RATIOS FOR POPULATIONS OF *MACROPHOLIDUS ATAKTOLEPIS* AND *M. RUTHVENI*. VALUES ARE MEANS  $\pm$  1 STANDARD DEVIATION; RANGES IN PARENTHESES. SAMPLE SIZES FOR SCALE COUNTS ARE GIVEN AT THE HEAD OF EACH COLUMN; FOR BODY PROPORTIONS, JUVENILES WERE NOT INCLUDED IN THE CALCULATIONS, AND SAMPLE SIZES FOR THESE ARE GIVEN ADJACENT TO THE RANGES. RANGES FOR SNOUT-VENT LENGTHS (SVLS) ARE GIVEN SEPARATELY FOR EACH SEX AND UNSEXED JUVENILES.

	<i>Macropholidus ataktolepis</i> , Bosque Cachil ( <i>N</i> = 9)	<i>Macropholidus ruthveni</i> , Bosque Monte Seco ( <i>N</i> = 24)	<i>Macropholidus ruthveni</i> , Cocumayo ( <i>N</i> = 2)	<i>Macropholidus ruthveni</i> , "Chongollapi" ( <i>N</i> = 2)
Transverse ventrals	20.9 $\pm$ 0.60 (20-22)	20.9 $\pm$ 0.86 (19-22)	20.0 $\pm$ 1.0 (19-21)	20 (AMNH 38818)*
Transverse dorsals	32.8 $\pm$ 1.92 (29-35)	34.1 $\pm$ 1.17 (32-37)	33.5 $\pm$ 0.5 (33-34)	33.5 $\pm$ 1.5 (32-35)
Enlarged medial dorsal pairs	15.3 $\pm$ 2.74 (12-20)	30.8 $\pm$ 2.15 (25-35)	28.0 $\pm$ 1.0 (27-29)	33.0 $\pm$ 2.0 (31-35)
Total dorsal rows-enlarged dorsal rows	17.4 $\pm$ 3.7 (12-22)	3.29 $\pm$ 1.79 (0-7)	5.5 $\pm$ 1.5 (4-7)	0.5 $\pm$ 0.5 (0-1)
Scales around midbody	19.7 $\pm$ 0.71 (18-20)	19.4 $\pm$ 0.70 (17-20)	19.0 (19)	18.5 $\pm$ 0.5 (18-19)
Subdigital lamellae, finger IV	13.2 $\pm$ 0.67 (12-14)	12.9 $\pm$ 0.88 (11-14)	14.5 $\pm$ 1.5 (13-16)	13.0 (13)
Subdigital lamellae, toe IV	17.6 $\pm$ 1.13 (16-19)	17.4 $\pm$ 0.86 (16-20)	18.0 $\pm$ 1.0 (17-19)	18.5 $\pm$ 0.5 (18-19)

TABLE 2. CONTINUED.

	<i>Macropholidus ataktolepis</i> , Bosque Cachil ( <i>N</i> = 9)	<i>Macropholidus ruthveni</i> , Bosque Monte Seco ( <i>N</i> = 24)	<i>Macropholidus ruthveni</i> , Caucumayo ( <i>N</i> = 2)	<i>Macropholidus ruthveni</i> , "Chongollapi" ( <i>N</i> = 2)
SVL (range) (sample size)				
Males				
Females	(29.0–35.0) (4)	(31.0–35.5) (5)	34.5	29.0
Juveniles	(38.5–43.0) (3)	(36.0–43.0) (12)	45.5	—
	19.5–22.0) (2)	(18.0–24.0) (7)	—	—
Head length/SVL	0.23 ± 0.01 (0.21–0.24) (7)	0.22 ± 0.01 (0.20–0.24) (15)	0.22 ± 0.01 (0.21–0.23)	0.25 (AMNH 38818)
Head depth/head length	0.68 ± 0.06 (0.59–0.79) (7)	0.64 ± 0.03 (0.60–0.72) (15)	0.68 ± 0.0 (0.68)	0.59 (AMNH 38818)
Tail length/total length (complete tails only)	0.69 ± 0.01 (0.68–0.70) (2)	0.68 ± 0.01 (0.67–0.69) (3)	—	—
Body length/SVL	0.50 ± 0.02 (0.48–0.54) (7)	0.51 ± 0.02 (0.48–0.56) (17)	0.54 ± 0.03 (0.51–0.57)	0.47 (AMNH 38818)

\*Some data for the "Chongollapi" paratypes of *M. ruthveni* are obtainable only for AMNH 38818 (see text).

178038). Prefrontals hexagonal, in narrow medial contact. Frontal hexagonal, longer than wide, broader anteriorly. Frontoparietals hexagonal with long medial suture, each individually much longer than wide, collectively nearly as wide as long. Interparietal heptagonal, longer than wide. Parietals irregularly polygonal, about as wide as long; equal to or shorter than interparietal. Parietal contacts the upper postorbital on each side (MCZ 178039, 178046, 178050, 178264–67), or parietal and postorbital separated by contact between posterior supraocular and upper anterior temporal (MCZ 178045), or there is narrow parietal–postorbital contact on the right side, which is reduced to a point on the left (MCZ 178038). Three postparietals (occipitals), two lateralmost scales large, hexagonal; medial scale small, pentagonal. First pair of medial dorsal scales on neck (nuchals) distinctly enlarged (broader and wider than following dorsals). Head scales smooth, with scattered pores mostly located around the periphery of dorsal head plates, temporals, and supralabials; a few pits on other head scales.

Lower eyelid with transparent disk. Two subequal supraoculars in direct contact with superciliaries (posterior one in contact with upper postocular; anterior supraocular irregularly hexagonal, posterior one squarish or pentagonal. Four superciliaries (three on one side in MCZ 178039), anterior scale more than twice as large as any other, and overlapping onto top of head. (Noble [1921a: 138] considered there to be five superciliaries in *M. ruthveni*, with the last being the scale here considered the upper postocular. We consider the latter scale part of the postorbital series because essentially none of its area is above the orbit. Noble used neither pre- nor postocular for any of the circumorbital series. Both *ataktolepis* and *ruthveni* typically have only four superciliaries under the present scheme.)

Nostril in extreme posterior part of anterior nasal scale, bulging into anterior part of posterior nasal; anterior nasal larger than posterior nasal (this condition is the same as in *M. ruthveni*, for which Noble [1921a:137] stated the condition as “[n]ostril between the nasals”). Loreal generally large, higher than wide, contacting the posterior nasal, prefrontal, anterior superciliary, preocular, second supralabial, and (except MCZ 178038) also narrowly contacting the frontonasal (see later for exceptions to this pattern).



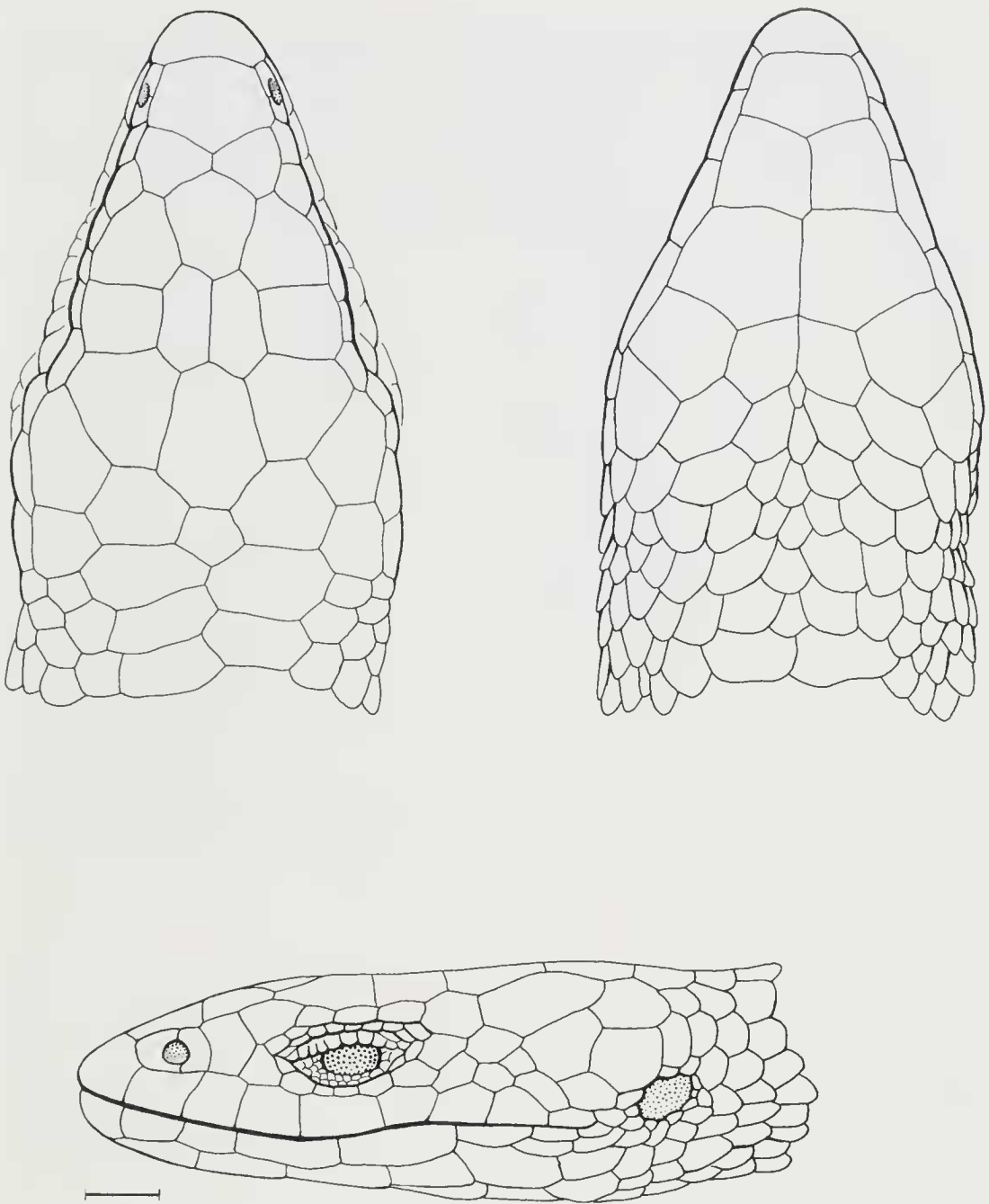


Figure 3. Head of *Macropholidus ataktolepis* in dorsal, ventral, and lateral views (MCZ 178050, female holotype). Bar = 1 mm.

Three unusual loreal conditions were observed: (1) loreal divided transversely into dorsal and ventral portions (MCZ 178039); (2) posterior nasal unusually small and with bilateral dorsal contact between loreal and anterior nasal (MCZ 178266); and (3) bilateral fusion of posterior nasal with ventral portion of loreal,

and contact of this enlarged scale with preocular (MCZ 178264); thus, loreal in this specimen does not contact supralabials.

Preocular triangular, small, in contact with loreal, second and third supralabials, and anterior subocular (contact with second supralabial reduced to a point in MCZ 178038 and 178050). Suboculars 3 (MCZ 178045, 178267) or 4 (all others); anterior and posterior scales largest. Postoculars 3, dorsal scale largest, ventral smallest (ventral scale in series with the suboculars, but more than twice as large as any subocular). Supralabials 7 (unilateral conditions of 8 and 6 in MCZ 178039 and 178264, respectively), 4th under eye and also longest.

Temporal region covered by four large polygonal juxtaposed scales (five on one side in MCZ 178046), plus a series (6–11) of smaller polygonal scales located generally anterior and ventral to the enlarged temporals (Fig. 3). Anterior dorsal enlarged temporal contacts upper postocular, parietal, and lateral postparietal (in MCZ 178045 also narrowly contacting posterior supraocular). Posterior dorsal enlarged temporal contacts lateral postparietal and the first transversely enlarged dorsal scale. Posterior ventral enlarged temporal separated from ear by one row of denticles. Ear opening round to vertically oval, bordered by small denticles; tympanum deeply recessed.

Mental with straight posterior margin (Fig. 3). Postmental large, obtusely pointed posteriorly, in lateral contact with infralabials 1–2. Two pairs of genials in contact on midline; anterior pair large, squarish, in contact with infralabials 2–3. Posterior pair large, pentagonal, in contact with infralabials 3–4. Two pairs of enlarged postgenials, anterior pair much larger than posterior pair, separated medially by two (anterior postgenials) to six (posterior postgenials) gular scales; anterior postgenials in contact with infralabials 4 or 4–5; posterior postgenials in contact with infralabials 4 (narrowly) and 5, or 5 only. Infralabials 5 (6 on one side in MCZ 178039 and 178267), 4th longest.

*Neck and Body.* Anterior gular region (between posterior pair of genials and enlarged gulars; see Fig. 3) filled with small polygonal gular scales in roughly six to seven irregular rows. Posterior gular region (level of posterior margin of ear opening to the gular fold) covered by four to six pairs ( $5\frac{1}{2}$  pairs in MCZ 178038) of enlarged, rhomboid gular scales, each wider than long. Gular fold weak, ill defined, and without hidden scale rows.

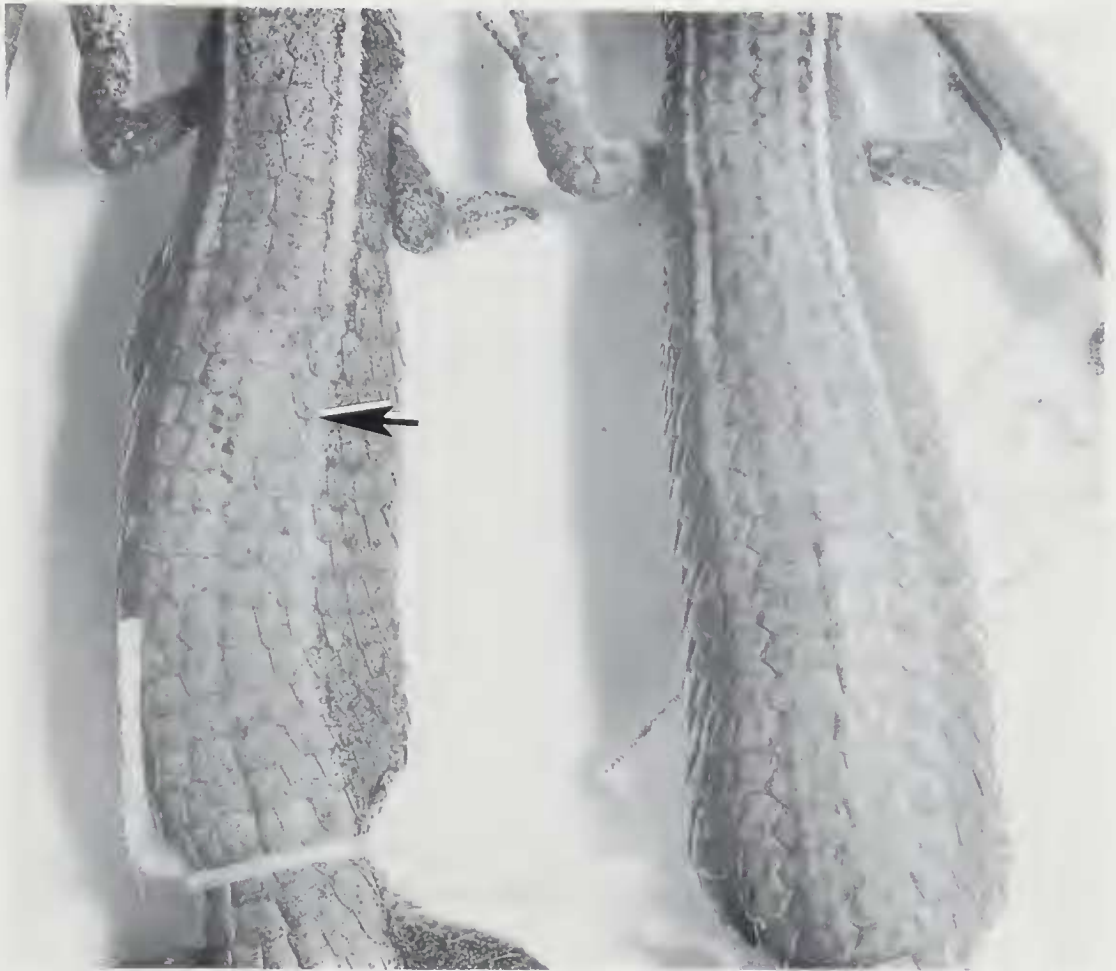


Figure 4. Comparison of dorsal body scalation of *Macropholidus ataktolepis* and *M. ruthveni*. Left: Holotype of *M. ataktolepis* (MCZ 178050), showing the break-up of the enlarged medial dorsals shortly behind the shoulder region (at level indicated by arrow). Right: *M. ruthveni* (ANSP 31765, from Bosque Monte Seco, Rio Zaña, Cajamarca Department), showing array of enlarged medial dorsals continuing to the tail (compare also Fig. 8). Note also the more squarish shape of the enlarged dorsals on the anterior part of the body in *M. ataktolepis* and their more hexagonal form in *M. ruthveni*.

Side of neck anterior to arm covered with medium-sized, rounded, juxtaposed to weakly overlapping scales. Axillary scales small, rounded, juxtaposed.

Dorsal scales of neck in two enlarged smooth rows (medial dorsals); anteriorly each medial dorsal  $\geq 2$  times as wide as long, gradually becoming more squarish by the shoulder region, continuing in two parallel series, becoming gradually smaller. Medial dorsals bordered on each side by a parallel series of somewhat enlarged paradorsals. Near midbody medial dorsal scales approximately equal in size to lateral body scales, no longer obvi-



ously in parallel series (Fig. 4); number of pairs of enlarged medial dorsals varies from 12 to 20: 12 (MCZ 178266), 13 (MCZ 178045), 14 (MCZ 178046, 178265), 15 (holotype, MCZ 178038), 17 (MCZ 178267), 19 (MCZ 178264), and 20 (MCZ 178039). Posterior dorsal scales smooth, squarish, slightly imbricate, in irregular transverse series with lateral body scales (Fig. 4). Usually slight misalignment between lateral and dorsal body scales over mid-dorsal region, caused by differing shapes and slightly different sizes of the two sets of scales. Posterior middorsal scales often irregular in shape (quadrangular to obtusely cycloid) and size. Scales around midbody 18–20.

Lateral body scales smooth, bluntly pointed, imbricate, slightly smaller than posterior dorsal scales. No lateral rows reduced in size, although a few scattered small, imbricate scales about one-half the size of other lateral scales are present. Lateral fold absent.

Ventralmost dorsals (i.e., the scales immediately bordering the ventral plates) somewhat larger than the other dorsal rows. Ventrals smooth, larger than ventralmost dorsals, squarish to rectangular, in four longitudinal rows, in 20–22 transverse rows between limbs. (Noble [1921a] included the ventralmost dorsal rows in his count of six transverse abdominal plates for *M. ruthveni*. Since the scales in these rows have the shape typical of the other dorsals, although slightly larger, they are considered part of the dorsal series here. Both *ataktolepis* and *ruthveni* have four longitudinal rows of *quadrangular* ventrals.) One pair of anal scales; one pair of enlarged preanals. Femoral and preanal pores absent.

*Tail and Limbs.* Caudal scales at base of tail dorsally and laterally hexagonal, imbricate, weakly striated to very weakly keeled dorsally. Ventral surface of tail with paired series of somewhat enlarged, squarish, smooth, weakly imbricate scales.

Upper surface of arm and hand covered with large, smooth, polygonal, imbricate scales that gradually decrease in size distally. Ventral surface of arm covered with smaller imbricate scales, somewhat conical and nonoverlapping proximally. Anterior, dorsal, and ventral surface of thigh with large, smooth, imbricate, plate-like polygonal scales. Posterior surface of thigh with small conical or pavement-like scales. Lower leg dorsally and ventrally with weakly imbricate scales half the size of those on anterodorsal surface of thigh. Top of foot with large imbricate scales twice or

more the size of those on lower leg. Palms and soles covered with small conical to pavement-like juxtaposed scales.

Subdigital lamellae as follows (roman numerals = digits; arabic numbers = range for subdigital lamellae in type series counted on one of each pair of feet for each specimen): forefoot, I 5–7, II 8–10, III 12–14, IV 12–14, V 9; hindfoot, I 6–8, II 9–12, III 13–17, IV 16–19, V 11–12.

*Coloration in Life (Holotype).* Dorsum medium brown. Top of head grayish brown. Dorsal and ventral surfaces of tail and dorsal surface of hindlimbs dark charcoal gray. Tan dorsolateral stripes from temporal region, fading into dorsal color just behind scapular region; bordered dorsally by dark gray/blackish thin line. Whitish supralabial/neck stripe present. Loreal, temporal, lateral neck regions and flanks dark charcoal gray, paling somewhat on flanks. Anterior gular region dull whitish with grayish wash. Venter similar, but with dull orangish wash in pectoral region and laterally. Edge between belly and flanks and pelvic area speckled with dark blackish flecks. Ventral surface of forelimbs with dull orangish wash and tiny dark flecks.

*Coloration in Preservative (Holotype).* Top of head and dorsal surface of body grayish brown, becoming greenish gray posteriorly on body, and slate gray on tail. Dorsal head scales and enlarged scales on top of neck heavily and finely speckled with black (speckling on neck concentrated on medial edges of light dorsolateral stripes); the speckling continues onto body but gradually decreases in intensity. Coloration of lateral surface of body and dorsal surface of hindlimbs dark grayish brown, sharply set off from dorsal coloration, heavily speckled with black. Lateral surface of neck and temporal region slate gray, with fine lighter flecks (visible only under microscope). Loreal region and supralabials yellowish brown, heavily suffused with black. Top of forelimbs yellowish brown, heavily speckled with black concentrated proximally. Pale (yellowish) dorsolateral stripe beginning as thin line on antero-lateral edge of parietals, widening on enlarged paradorsals of neck (occupying about  $\frac{1}{3}$  of these scales), gradually fading posterior to shoulder region. Very thin white supralabial stripe beginning at posterior edge of second supralabial, continuing along middle of supralabial row, then dropping to labial border on last two supralabials and continuing to anteroventral border of ear; several

scales with light centers forming line behind the ear, but not forming distinct stripe. Ventral surface of head, neck, and body grayish white, finely (on head and neck) to heavily (posteriorly and laterally on body) speckled with black. Ventral surface of forelimbs whitish, with only a few black speckles. Ventral surface of hindlimbs whitish, heavily speckled with black. Palms dusky. Soles dark gray brown. Ventral surface of tail dark slate gray with fine lighter speckling.

The holotype retains more details of coloration and pattern than any paratype, probably as a result of differential preservation. Six paratypes (MCZ 178045–46, 178264–67) are very dark, almost black. The other two (MCZ 178038–39) are essentially as described for the holotype, but the dark ventral pigmentation is more evident, and there is no sharp distinction between the dorsal and lateral body pigment. The dorsolateral stripes are visible in all paratypes.

Comparison of *Macropholidus ataktolepis*  
with *M. ruthveni*

In general form, body proportions, and coloration, *M. ataktolepis* and *M. ruthveni* are virtually indistinguishable (preserved specimens of both species can differ markedly in color and pattern, but we attribute these differences to the effects of preservation rather than to substantive color differences in life; see the following description of coloration in *ruthveni* for a potential pattern difference between the species). Because scale fusions and some intraspecific variation are characteristic of many species of microteiidids generally (the so-called “normal” fusions or divisions that give rise to variation in, for example, the number of supralabial scales), the three scutellational differences between *ruthveni* and *ataktolepis* noted in the diagnosis are commented upon briefly here.

*Prefrontal Scales and Other Head Plates (Figs. 3, 5).* The presence of paired prefrontal scales between the frontonasal and frontal scale in *ataktolepis* creates differences between *ataktolepis* and *ruthveni* in the shapes of these scales. In *ataktolepis*, both the frontonasal and frontal are hexagonal, with oblique angles posteriorly and anteriorly, respectively. In *ruthveni*, the frontonasal is squarish and the frontal pentagonal, and the two scales meet



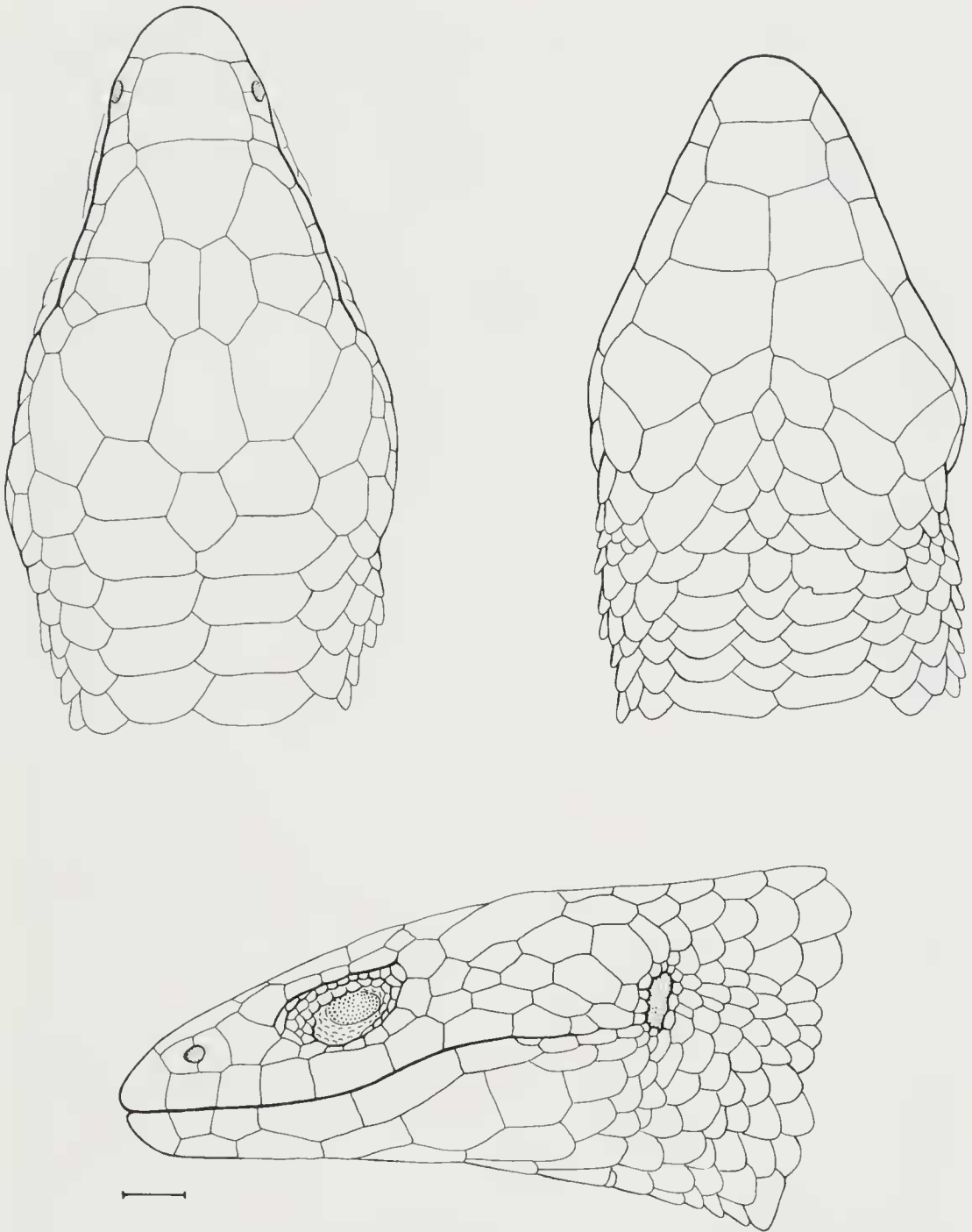


Figure 5. Head of *Macropholidus ruthveni* in dorsal, ventral, and lateral views (MCZ 14041, female holotype). Lateral view is right-side reversed. Bar = 1 mm.

in a straight border. In some individuals of *ruthveni*, the frontal shape might be interpreted as marginally heptagonal, produced by more than point contact between the frontal and first superciliary; in these cases, the frontal still retains a straight anterior

border, and the anterolateral sides of the "heptagon" are very short.

The prefrontal scales in *ataktolepis* are well defined and consistent in size, shape, and position in the available specimens (Fig. 3). In the geographically heterogeneous sample of 28 specimens of *ruthveni*, three specimens show significant variation in the region of the frontal/frontonasals. With the exception of MCZ 178036, these cases result in highly irregular and asymmetric scale patterns. MCZ 178036 has a pair of small triangular prefrontals at the lateral juncture of the frontal, frontonasals, and first superciliaries, which appear to have formed from fused portions of each of those scales; they are widely separated on the midline by a broad frontal-frontonasal contact, as is normal in *ruthveni*. The other two *ruthveni* specimens are more aberrant. FMNH 232606 is unusual in the form of the frontal-frontonasal suture on the left side (curved posteriorly rather than straight), and it has two partial sutures within the frontonasal, which partially delimit a large irregular azygous scale on the left side between the frontal and frontonasal. A similar condition is seen in FMNH 232599, except that the supernumerary sutures are complete and the azygous scale itself is longitudinally divided into a medial and smaller lateral portion (the right side of this specimen is, as in FMNH 232606, "normal"). The scales so formed are highly irregular in shape and do not approach the regular prefrontal shapes seen in all specimens of *ataktolepis*.

The only unusual conditions of head plates in the series of *ataktolepis* are (1) the nearly complete fusion of the left frontoparietal with the posterior supraocular in MCZ 178045, a fusion also seen in a paratype of *ruthveni* (MCZ 147313; Noble [1921a: 139] stated that this was on the left side of one of the paratypes, but it is on the right side of MCZ 147313 and none of the other paratypes has this condition); and (2) the fusion of each posterior nasal scale with the corresponding ventral portion of the loreal (MCZ 178264), as already described.

Prefrontal scales vary in their presence/absence within and among species of the presumably (see later) closely related genus *Pholidobolus*. Other than *Pholidobolus macbrydei*, however, in which the condition is apparently variable (Montanucci, 1973: 16), prefrontals are typically present or absent in the other species.

Montanucci (1973:37) stated that there was a "high frequency" of prefrontal scales in *P. macbrydei* but did not give a specific proportion, nor state whether the variation was intra- or inter-populational; in a sample of six *macbrydei* from widely separated geographic areas (Cotopaxi and Azuay Provinces, Ecuador; MCZ 154631–33, 163958–59), all individuals lacked prefrontals. It is the characteristic shape and population-specific nature of the prefrontals in *Macropholidus ataktolepis*, their absence in a geographically heterogeneous sample of *ruthveni*, and the coincidence of this character with unusual dorsal scale pattern (described in greater detail later) that lead us to interpret the nature of the prefrontals as characteristic of *M. ataktolepis*.

A high proportion of scale aberrancies in *ruthveni* involving the region of frontal–frontoparietal contact is perhaps significant, in that this region gives rise to one of the diagnostic differences between *M. ruthveni* and *M. ataktolepis*. Such an association between intraspecific variants and interspecific differences has been inferred for interspecific scale differences in one other group of microteiid lizards (Donnelly *et al.*, 1992).

*Dorsal Scales of the Body* (Fig. 4). The paired series of vertebral scales in both *Macropholidus ruthveni* and *M. ataktolepis* begin on the neck as transversely elongate hexagonal or rectangular scales. In both species (but seemingly more so in *ataktolepis* than in *ruthveni*; see Fig. 4), they become gradually more squarish posteriorly by extension in the longitudinal dimension, usually noticeably so just behind the shoulder region. In *ruthveni*, the enlarged scales continue virtually to the tail base (Figs. 4, 8). In *ataktolepis*, however, there is a generally rather abrupt transition to small dorsals by midbody (Fig. 4). The posterior dorsal scales behind this transition zone in *ataktolepis* are slightly larger than the lateral body scales at the same level and usually have straight posterior borders, in contrast to the bluntly pointed borders of the lateral scales. The transition to smaller scales in *ataktolepis* is sometimes accompanied by slight irregularities in the arrangement of dorsal scales, caused by varying scale sizes in the transition zone.

A comparison of the number of pairs of enlarged vertebral scales relative to the total number of transverse rows of dorsal scales (occiput to posterior margin of the leg) demonstrates this differ-



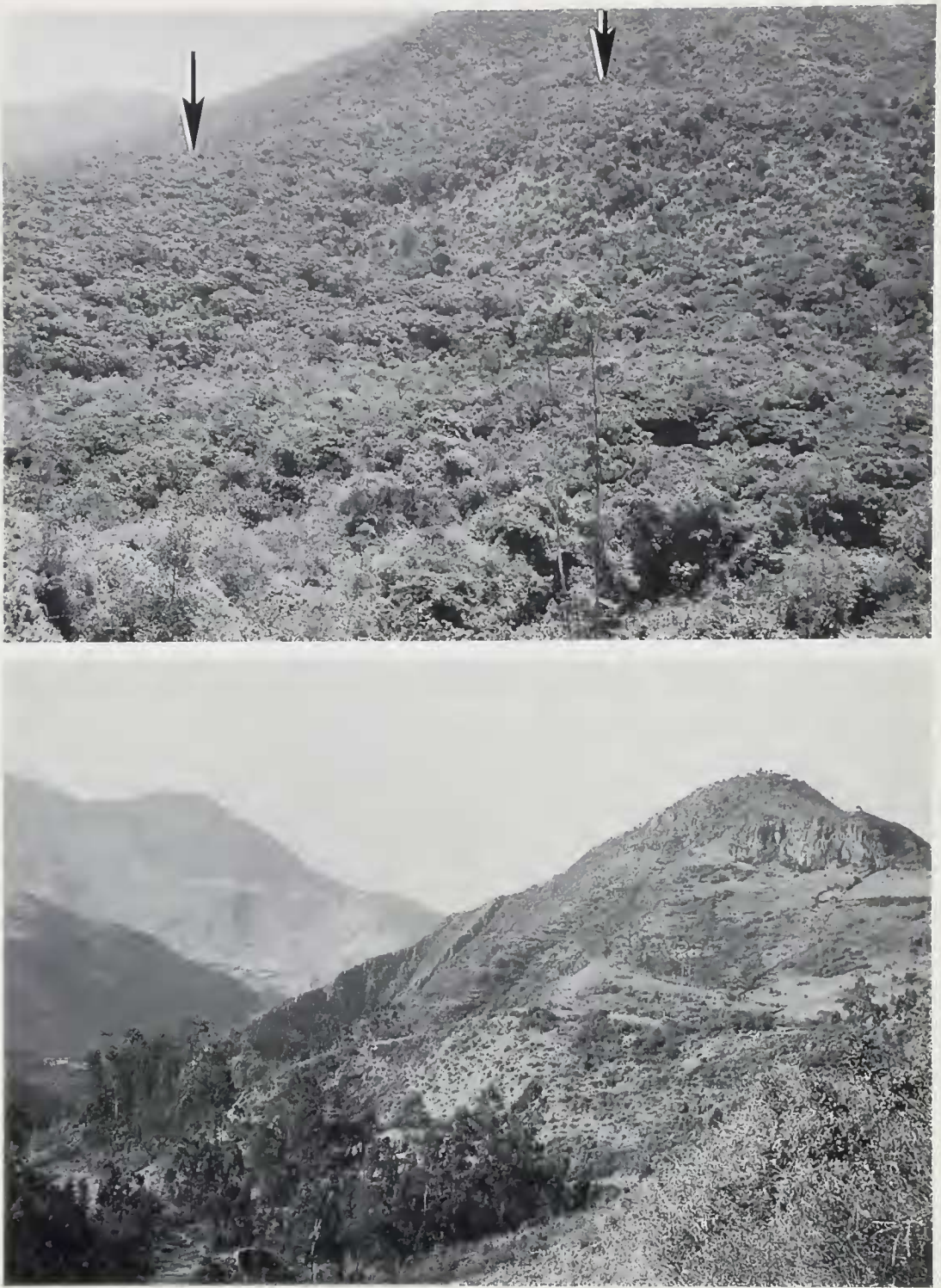


Figure 6. Top: Bosque Cachil as seen from the slope on the opposite side of the valley. Arrows mark the approximate upper extent of forest, above which is short bushy vegetation. The forest extends to the left and right off both sides of the photograph, but most of its extent is encompassed within the photograph. Bottom: General view of the terrain immediately down the valley from Bosque Cachil. Most slopes are denuded of vegetation. The trees in the lower left are *Eucalyptus*. Both photographs were taken on 28 September 1991.



ence between *ruthveni* and *ataktolepis* well. Both species have comparable total numbers of scales in this area (32–37 in *ruthveni*; 29–35 in *ataktolepis*), but the number of pairs of enlarged dorsals in *ruthveni* is 25–34 (average of 3.3 for the difference between total transverse dorsals and enlarged dorsals), whereas in *ataktolepis* it is only 12–20 (average of 17.4 scales difference) (see Table 2).

*Temporal Scales* (Figs. 3, 5). All specimens of *M. ataktolepis* have a regular arrangement of four enlarged temporal scales (Fig. 3; MCZ 178046 has five on one side), and the total number of temporal scales (the region bounded by the postoculars, supralabials, parietals–postparietals, and the anterior margin of the ear) is 10–14 on each side. On the other hand, the arrangement of temporal scales in *ruthveni* is more irregular (Fig. 5). The fragmentation of scales in the temporal region in *ruthveni* makes the delineation of “enlarged” from “normal” temporals a somewhat arbitrary distinction, as there is often a continuous gradation in scale sizes. The total number of temporal scales in *ruthveni* is 11–21, with the number that might be considered “enlarged” ranging from 1 to 7 (mode = 4, with other strong modes at 2 and 5). Some individuals of *ruthveni* are highly asymmetrical in the number and size of temporals on each side; this was not observed in any *ataktolepis*.

### Distribution, Habitat, and Natural History

*Macropholidus ataktolepis* is known only from the type locality, “Bosque Cachil.” The following observations are largely extracted from Cadle’s field notes made during a visit to Bosque Cachil on 28 September 1991 (see Figs. 6, 7). The site presently has a small remnant of humid forest lying in a montane valley (Fig. 6), at the bottom of which is a small stream, known locally as Quebrada Cachil. Most of the forest is between 2,400 and 2,500 m, with some riparian forest extending somewhat lower. Dillon *et al.* (1994) estimated the area of Bosque Cachil at about 100 ha. Surrounding the forest, the general habitat is scrubby chaparral-like bushland and disturbed terrain and obviously much drier (Fig. 6); however, the original extent of forest prior to human intervention is unknown and possibly was not much greater than at present. Montane forests this far south in the western Andes of Peru are usually



Figure 7. Understory vegetation at Bosque Cachil, showing generally small, short-statured trees, but with abundant mosses and, in this view, bromeliads. A relatively long exposure due to low ambient light level resulted in slight fuzziness in the photograph. Photographed 28 September 1991.

quite localized because local features of climate and aspect limit the extent of forest development (see H. W. Koepcke, 1957, 1961; H. W. Koepcke and M. Koepcke, 1958).

The end of September, when these observations were made, is well into the dry season (approximately May to December in this



portion of the Andes in Peru). At that time, the general aspect of Bosque Cachil was quite dry, although clear evidence of seasonal humidity was present. The forest is dominated by *Podocarpus*, with lesser amounts of *Clusia* and *Guarea*. Some large bromeliads were present (Fig. 7), but nowhere were these dense. Orchids were present but not abundant, but no tree ferns (*Cyathea*) were seen. Mosses festooned most trees, but at this time these were all dry, crackly, and brown. Another indication of the dryness was the fact that soil under even large boulders was dry. The lower part of the valley below Bosque Cachil is scrubby chaparral-like bushland and secondary growth, including introduced *Eucalyptus* (Fig. 6). According to local inhabitants, the area is quite wet and cold from about January to April, sometimes with dense fog. The characteristics of the streambed at the bottom of the valley give another indication of the seasonal abundance of water at Bosque Cachil. In September 1991, stream flow was reduced to approximately 1–2 m wide at most points. However, the channel is deep and scoured in places, with many moss-covered boulders, cascades, and deep pools. This suggests much greater water flow during parts of the year. During a visit to Cachil on 17 May 1993, M. O. Dillon (personal communication) reported a constant rain of about 2 hr, with high humidity lasting through the afternoon and evening.

The forest of Cachil was apparently not studied by Hans and Maria Koepcke during their extensive surveys of the western Andean forest remnants of Peru (H. W. Koepcke and M. Koepcke, 1958; H. W. Koepcke, 1957, 1961; M. Koepcke, 1954, 1961). They did, however, study several other forest isolates on the south side of the Rio Chicama valley. They characterized the forests of Hacienda Llaguen (07°40'S, 78°40'W), directly south of Bosque Cachil across the Rio Chicama valley, and spanning comparable elevations (1,700–2,900 m), as “[c]actus and bushsteppe; transition to riparian forest and mesothermic rainforest; light evergreen mountain forest to primary rainforest of the oligothermic zone in some places . . . between 2400 and 2900 meters” (H. W. Koepcke, 1961:31). The forest of Cachil, in both elevational zone and dominant vegetation, appears to correspond well to the “oligothermic rainforest zone,” characterized by the presence of *Podocarpus* and trees locally densely covered with epiphytes (H. W. Koepcke, 1961:164).

In general respects, the climatic regime (rainy season roughly January to April) appears similar to that at another forest isolate just north of Bosque Cachil, Bosque Monte Seco on the Rio Zaña (see Cadle, 1989, 1991; Cadle and McDiarmid, 1990; Sagástegui and Dillon, 1991). However, despite the presence of abundant mosses on the trees and a similar floral composition, Bosque Cachil has a drier aspect and is at a slightly higher elevation (2,400–2,500 m) than much of the humid forest at Monte Seco (1,500–2,500 m). Indicators of the greater aridity at Cachil include fewer streams, and those present with reduced water flow; shorter-stature forest in general; reports by locals of only occasional dense fog during the rainy season (ubiquitous during the rainy season at Bosque Monte Seco); and the absence of tree ferns (although possibly these were removed by earlier inhabitants of the region, as they are used medicinally; tree ferns, however, are common at Bosque Monte Seco; see Sagástegui and Dillon, 1991; Dillon *et al.*, 1994).

The flora of Bosque Cachil appears to be a small subset of that at Bosque Monte Seco (Sagástegui and Dillon, 1991; M. O. Dillon, personal communication), although with different dominant elements. Whereas the forest of Cachil appears to correspond to Koepcke's (1961) "oligothermic" rainforest, the more humid forest of Bosque Monte Seco corresponds more with the "mesothermic rainforest" and "cloud forest" habitats discussed by Koepcke (1961), which in general occur at slightly lower elevations in western Peru than the "oligothermic rainforests" (H. W. Koepcke, 1961). Other than an enigmatic species of *Dipsas* (Colubridae), no species of amphibians or reptiles presently known from Bosque Cachil occur also at Bosque Monte Seco, but much more extensive sampling of the herpetofauna needs to be done at Cachil.

All specimens of *Macropholidus ataktolepis* were collected under rocks during the day. This species is presumably diurnal, as is its close relative *M. ruthveni* (see later). One female (MCZ 178045) collected on 17 May contained one developing follicle, whereas the female holotype, collected at the end of September, and MCZ 178264, collected in December, contain no yolking follicles. The only other amphibians or reptiles now known from Bosque Cachil are undescribed species of *Stenocercus* (Tropiduridae), *Dipsas* (Colubridae), and *Eleutherodactylus* (Leptodactylidae) presently under study and a species of *Gastrotheca* (Hylidae).



NOTES ON *MACROPHOLIDUS RUTHVENI* NOBLETypes, Type Locality, and a New Series  
from the Rio Zaña

Noble (1921a:138) described *Macropholidus ruthveni* on the basis of four specimens: the holotype and one paratype in MCZ and two additional paratypes in AMNH. The holotype, MCZ 14041 (Figs. 5, 8), is from "Coucumayo, a half-way station between the towns of Huancabamba and Tabaconas" (Noble (1921a: 139), and MCZ 147313 (originally MCZ 14043) is from "Chongollapi" (=Chongoyape; see additional comments on localities later). The two AMNH paratypes, AMNH 38817–18, were both originally cataloged with "Coucumayo" as the locality. However, Noble (1921a:139) stated that two specimens were obtained at each of the two localities mentioned in the type description; hence, one of the AMNH specimens is from Coucumayo and the other from Chongoyape. Noble gave sufficient detail in his description to identify AMNH 38818 as the "Chongollapi" specimen (21 ventral scales between the collar [=gular fold] and the anal plates, and presence of a third supraocular in one of the Chongoyape specimens, as is the case in the holotype; AMNH 38818 is the only paratype that satisfies these criteria). AMNH 38817, then, is the other specimen from the type locality, Coucumayo.

We have not found Coucumayo (stated by Noble to consist of a single house) listed in gazetteers or on maps, but Noble's description places it on the eastern spur of the Cordillera Huancabamba on the border between the departments of Piura and Cajamarca (Fig. 2). According to Noble (1921a:139), Coucumayo is "one of the highest points of the trail but is probably not over 8,000 feet [=2,440 m] in altitude." Most parts of the cordillera between Huancabamba and Tabaconas rise well over 3,000 m, but a break with maximum elevations between 2,000 and 3,000 m occurs 18–20 km southeast of Huancabamba at approximately 05°20'S, 79°20'W (1:480,000 maps for the departments of Piura and Cajamarca, Instituto Geográfico Nacional, Lima). This is the present location of the main route between Huancabamba and Tabaconas. Based on the elevation stated in the description, the type locality of *ruthveni* is most likely along this part of the ridge. Thus, the type locality is east of the continental divide in upper reaches of the Rio Huancabamba/Chamaya drainage.



Figure 8. Holotype of *Macropholidus ruthveni*, MCZ 14041, an adult female. Noble (1921a:139) stated that the light borders of the scales visible in the type were "not so distinct" in life. He also did not mention the dorsolateral stripe, visible faintly in the photograph.

Noble did not give information about the general environment of Coucumayo, stating only that the two specimens of *Macropholidus* collected there were from a pasture. Huancabamba lies in a dry rain-shadow valley (Noble, 1921b; T. A. Parker *et al.*, 1985); however, humid forest persisted even recently at elevations above 2,100 m on the slopes north and east of Huancabamba (T. A. Parker *et al.*, 1985) and possibly lower in 1916 when Noble

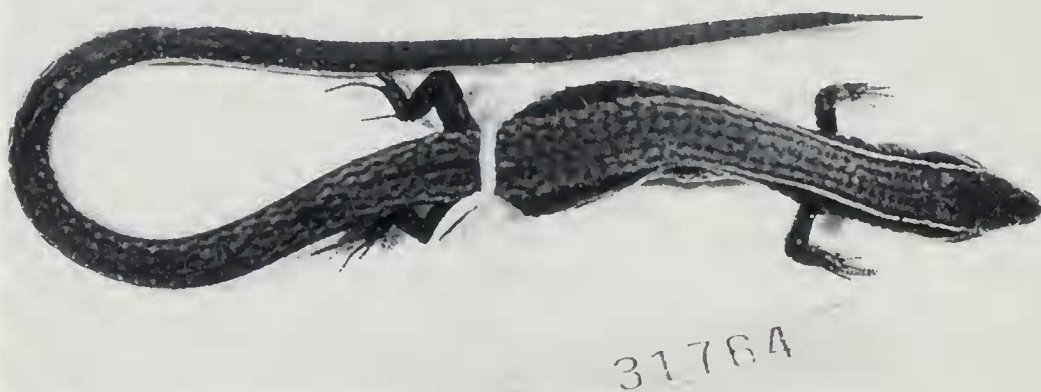


Figure 9. Dorsal view of *Macropholidus ruthveni* (ANSP 31764), an adult female from Bosque Monte Seco, Rio Zaña valley, Cajamarca Department, Peru.

visited the area. Tabaconas itself lies in a valley characterized by humid montane forest (Barbour and Noble, 1920; T. A. Parker *et al.*, 1985).

Noble purchased two of the paratypes (MCZ 147313, AMNH 38818) in Chongollapi (=Chongoyape) from a restaurant keeper, who had preserved them in aguardiente. Chongoyape is at 200 m elevation on the Rio Reque in the coastal desert region, Lambayeque Department, 06°39'S, 79°24'W (Fig. 2), but Noble suggested that the specimens probably came from "some of the high altitudes fifty or a hundred miles inland." This assessment makes sense with respect to natural history observations for *ruthveni* made by Cadle on a population at the Rio Zaña (see later). It seems unlikely, therefore, that *ruthveni* would be found in low coastal desert (but see discussion of KU 220845, later). Noble's estimate, however, of "fifty or a hundred miles inland" is probably a substantial overestimate, whether considered in airline or trail distances; the nearest humid forests are about 50 km airline distance and 100 km by the existing road east of Chongoyape (Cadle, personal observations).

Presently, the type specimens of *M. ruthveni* are in fair condition and somewhat soft (the MCZ paratype is a small juvenile, which has had its head removed, critical-point-dried, and mounted for scanning electron microscopy; the mounted head still retains the outline of the head scutellation). The holotype (Fig. 8) is an adult female, AMNH 38817 is an adult male, and AMNH 38818 is probably a male based on swelling of the tail base.

In addition to the type series, we studied a series of *ruthveni* collected by Cadle from the upper Rio Zaña (Bosque Monte Seco), Cajamarca Department (Figs. 2, 9; for details concerning the area, see Cadle, 1989, 1991; Cadle and McDiarmid, 1990; Sagástegui and Dillon, 1991). These specimens include ANSP 31764–69; FMNH 231771, 232599–608; MCZ 178036–37; and JEC 7202, 7211, 7463, 7528, 7798–99, 8062. All of these specimens are from within a 3-km airline radius north to east of Hacienda Monte Seco, Rio Zaña, Cajamarca Department, Peru (79°07'W, 06°51'S; Fig. 2). KU 220845, which we refer provisionally to *M. ruthveni*, is from Chaclacayo, Lima Department, a locality far south of the other known localities for *ruthveni* (Fig. 2). Details concerning this specimen are given later, but it was not included in the sum-



maries of variation for *ruthveni* immediately following. Data on the type series and the Rio Zaña sample of *Macropholidus ruthveni* are summarized here, as are observations on the natural history of this species at the Rio Zaña study site.

### Descriptive and Variational Comments

The series referred to *Macropholidus ruthveni* from the Rio Zaña (Bosque Monte Seco; see Fig. 9) is similar to the type series in all scutellational features, except for what might be considered normal (and, in this case, minor) intraspecific variation. Table 1 gives measurements and scale counts of the holotype of *M. ruthveni*, and Table 2 summarizes scutellation and mensural features in all samples of the species. The following comments augment the characterization given by Noble (1921a).

Noble (1921a) noted several minor variations in head scalation in the type series, and the larger series examined by us does not significantly alter his characterization. Some of the variation was already discussed in the context of comparing *ruthveni* and *ataktolepis*. Other variations are noted here. Virtually all specimens have two large supraocular scales on each side. The holotype differs in having three supraoculars on each side, the third being a small quadrangular scale formed by a short suture across the posterolateral portion of the second supraocular (Fig. 5). One other specimen, AMNH 38818 from Chongoyape, has three supraoculars on the right side, similar to the pattern in the holotype, and the usual condition of two supraoculars on the left side. No specimens from the Rio Zaña showed this variation.

Proportional measurements and meristic counts for the specimens of *ruthveni* we examined are as follows. Complete tail 2.03–2.26 times SVL in three adults, 1.61–1.87 times SVL in five juveniles, and 0.62–0.69 times TL (adults and juveniles combined). The holotype, a female (SVL 45.5 mm), is the largest specimen. Range of SVL for other females was 36–43 mm, greater than the range for males (29–35.5 mm). The forelimb extended forward reaches the posterior border or middle of the eye.

Superciliaries usually four, occasionally three or five (Noble included the scale we consider the upper postocular in his superciliary series, and therefore stated the condition in the type series as five superciliaries); postoculars usually three, occasionally two.



Supralabials seven, with the fourth under the midpoint of the eye (eight and six on two sides each). Infralabials five (six on one side, four on two sides). Scales around the middle of the body 17–20 ( $19.3 \pm 0.73$ ). A distinct loreal, higher than wide, separating the posterior nasal from the preoculars.

No lateral body fold or lateral scales of reduced size. Four transverse rows of quadrangular ventrals (Noble's count of six rows included the ventralmost rows of dorsals; see the comments in the comparison of *ataktolepis* with *ruthveni*).

Subdigital lamellae as follows (roman numerals = digits; arabic numbers = range for subdigital lamellae counted on one of each pair of feet for each specimen): forefoot, I 5–7, II 8–11, III 11–14, IV 11–16, V 7–9; hindfoot, I 6–8, II 10–12, III 12–15, IV 16–20, V 10–12.

### Distribution

The new series of *Macropholidus ruthveni* from the Rio Zaña is from about 175 km south of the type locality and in the southerly adjacent river valley to the Rio Reque system, from which the two "Chongollapi" paratypes presumably came (Fig. 2). Other species of amphibians and reptiles known from the Rio Zaña study site, including *Stenocercus percultus*, *S. eunetopsis*, *Telmatobius latirostris*, and *Philodryas simonsi* (Cadle, 1991, and personal observations), are also known from montane forests of the upper Rio Reque. To the extent that the distribution of *M. ruthveni* is representative of the same pattern, Noble's suspicion that the two "Chongollapi" paratypes of *ruthveni* were from higher elevations east of Chongoyape seems likely. This species thus appears to be another example of a taxon occurring in humid montane forest isolates on the western slope of the Andes in northern Peru and might be expected in other similar forests of this area (see Cadle, 1991:85–89, for discussion and other examples). As is the case for *Telmatobius latirostris* and several other elements of the west slope herpetofauna of northern Peru (Cadle, unpublished data for the Bosque Monte Seco herpetofauna), *Macropholidus ruthveni* also occurs east of the continental divide (the type locality is in the upper Rio Huancabamba drainage; Fig. 2).

If the population represented by KU 220845 proves to be re-

ferable to *Macropholidus ruthveni* (see discussion later), then it is widely disjunct from the nearest known more northern locality (Fig. 2). Moreover, this would imply that the range of *ruthveni* encompasses that of *ataktolepis*. However, given the fragmented nature of habitats for *ruthveni* in northwestern Peru, any areas of sympatry are likely to be quite narrow or restricted to single forest isolates (see Montanucci, 1973:20–24, for a similar pattern for montane *Pholidobolus* in Ecuador).

At the Rio Zaña study site, *Macropholidus ruthveni* was collected between 1,440 and 2,210 m elevation. The only other elevational data for the species is Noble's statement (1921a:139) that the type locality was "probably not over 8000 feet [=2,440 m]."

#### Coloration in Life and Preservative

The following color notes are based on a detailed field description of FMNH 232602 (female), with supplemental notes from 35-mm Kodachrome transparencies. The coloration is nearly identical to that already described for *M. ataktolepis*. Dorsum medium brown with fine black specks, becoming grayish brown toward head, grayish on tail. Lateral surface of body darker brown to grayish, more or less abruptly set off from dorsal coloration; becoming darker on neck and temporal region. Dorsolateral golden stripe begins behind eye and fades rather abruptly at approximately midbody (see Fig. 9). Cream-colored labial stripe begins on upper labials and extends to base of forearm. Tail dark gray with obscure small dark spots dorsally. Chin white. Belly yellowish white, golden toward sides. Ventral surface of tail gray with darker markings.

The coloration of *Macropholidus ruthveni* in preservative is essentially like that of *M. ataktolepis*. The amount of dark ventral pigment varies enormously, from almost none to essentially the entire venter very dark, in the series available. The chin and throat, however, are usually paler than the rest of the venter. The dorsolateral stripe in *ruthveni* occasionally (e.g., ANSP 31764, FMNH 232605) continues as a vague discontinuous line extending anteriorly along the superciliary scales and canthal region. Both *ruthveni* and *ataktolepis* have a supralabial stripe extending to the anterior margin of the ear. In the Rio Zaña specimens of

*ruthveni*, this stripe continues posterior to the ear for some distance, and in most specimens extends to the base of the forelimb. In the small series of *ataktolepis*, at most only a few scales posterior to the ear have whitish pigment, resulting in a line of small white dots; in no case do these form a continuous line or extend farther than the midpoint between the posterior margin of the ear and the base of the forelimb. This pattern difference may prove to be a consistent difference between the two species, although we hesitate to conclude this given the small samples presently available for *ataktolepis* and differences in preservation between the *ruthveni* and *ataktolepis* samples.

Noble (1921a) did not describe the colors in life of the types of *M. ruthveni* in any detail, noting only that the ground color was "browner" than the blackish coloration in preservative (see Fig. 8). Curiously, he mentioned neither the dorsolateral light stripes nor the light supralabial-ear stripe characteristic of the Rio Zaña population of *ruthveni*. The state of preservation of the type series is such that details of pattern are difficult to discern. However, the dorsolateral light stripes are clearly visible in all specimens of the series (see Fig. 8); they extend from the supraoculars and fade on the body behind the shoulder. The supralabial-ear stripe is less discernible. It is visible in the holotype as a vague light line below the eye; the posterior and anterior extent cannot be discerned. In AMNH 38817 it is visible as a broken line extending from below the eye to the anterior margin of the ear.

### Habitats and Activity

Habitats in which *Macropholidus ruthveni* occurred at the Rio Zaña study site spanned a range: relatively pristine montane cloud forest, secondary and disturbed forests, overgrown to relatively open cafetals, and open brushy hillsides. All active specimens were encountered during the day from midmorning (0945 hours) to late afternoon (1700 hours), usually in areas with much leaf litter (although they were also found crossing open trails or dirt roads). Many specimens also were found inactive during the day under rocks (occasionally logs) or, in one instance, under moss 1.5 m above the ground on a large boulder. Noble (1921a:139) stated that two specimens of the type series were collected under flat rocks in a pasture. One specimen from the Rio Zaña (FMNH



232605) was disgorged by a specimen of the colubrid snake, *Coniophanes longinquus* (Cadle, 1989).

### Reproduction and Communal Nesting

Females of *Macropholidus ruthveni* with eggs were collected at the Rio Zaña study site on 15–18 January and 17 June; in addition, egg clutches were discovered on 17 June (see the following). Five females (FMNH 232603, 232608, collected in June; ANSP 31764, 31767, 31769, collected in January) contained two eggs each; ANSP 31765, collected in January, contained one. Hatchlings (FMNH 232599–600, JEC 7528; SVL 18–19.5 mm) were collected on 14 May and 18 June. These observations span the early rainy season (January) and early middle dry season (May to June), and suggest either a lengthy or multimodal period of reproduction in this population.

Communal nesting is known in a variety of lizards and snakes and is probably more widespread than has been reported. The only published records for teiids are for the macroteiid *Kentropyx calcaratus* (Magnusson and Lima, 1984) and the microteiid *Neusticurus ecleopus* (Uzzell, 1966). In addition to observations reported here for *Macropholidus ruthveni*, Cadle has observed one instance of communal nesting in another microteiid, *Proctoporus bolivianus*, in southern Peru (Upper Rio Santa Maria, Cuzco Department). The communal nesting habits of *Macropholidus ruthveni* were observed at Bosque Monte Seco in the Rio Zaña valley, Cajamarca Department, Peru (for discussion of this locality, see Cadle, 1989, 1991; Cadle and McDiarmid, 1990). In this case, the communal nest of *M. ruthveni* was coincident with a communal nest of the colubrid snake *Dipsas oreas*.<sup>4</sup>

These observations were made by Cadle on 17 June 1987 at 1,490 m elevation at the Rio Zaña study site. On that date, he

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<sup>4</sup> This species has been taxonomically confused (see Orcés and Almendáriz, 1987; Kofron, 1982) and has not been previously reported from Peru. Specimens recently collected by Cadle at several localities in northern Peru, and additional museum specimens to be reported elsewhere, are tentatively identified as *Dipsas oreas* pending further study of geographic variation in this complex. These collections confirm the species' presence in humid montane forests of the western Andes of Peru south to at least the Rio Zaña.



observed a *Macropholidus ruthveni* crossing a dirt road and seeking refuge in a hole close to the base of the adjacent road embankment, which was a mixture of clay and small rocks. Upon digging to extract the lizard, a communal nest of this species was discovered, and with little further digging several snake eggs and egg shells were discovered. The eggs were laid in a crevice (1–3 cm wide and 15–20 cm in vertical dimension) beneath a loose conglomerate of flaky rocks and clay. The crevice was lined mostly with moist clay mixed with some gravel. Lizard eggs were found between 5 and 30 cm from the entrance to the crevice. The snake eggs were found between 20 and 30 cm from the entrance and were intermingled with the lizard eggs. Although eggs were found up to 30 cm from the opening, since the crevice was oriented roughly parallel to the face of the roadcut, the deepest part of the crevice was only about 15 cm from the surface of the soil. Because the road embankment faced roughly eastward and was not covered or overshadowed by dense vegetation, the soil at this site probably would have been warmed daily by the morning sun.

Both the microteiid and the snake eggs were apparently of varying ages (minimally, two viable snake clutches were present, plus one recently hatched clutch). The remains included some microteiid eggs that were already well decomposed, other more recent shell remains, and several unhatched eggs. A total of 220 microteiid shell remains were found (this is a minimum count), plus eight viable eggs, one of which hatched the next day (FMNH 232599; SVL 18 mm). The first snake eggs encountered included five empty shells together in a group; a bit farther in were three additional shells that looked roughly the same age as the first five and might have been part of the same clutch. A second clutch included seven viable eggs. The deepest clutch included five viable eggs plus one fungus-ridden egg. These two latter clutches had embryos of slightly different ages when one egg of each was opened on 18 June (the deepest clutch had a smaller embryo).<sup>5</sup> Clearly

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<sup>5</sup> Five of the snake eggs were transported to Lima on 27 June, where they were kept in moist paper towels in a plastic bag while fieldwork was completed elsewhere in Peru. They were then transported back to the United States, where they hatched between 23 September and 1 October. Egg-laying in subterranean retreats may seem an unusual behavior for “arboreal” snakes such as *Dipsas oreas*. Although

the microteiid nest represents a true "communal" nest, with many females contributing eggs. The same is probably true for the snake clutches, although improbably they could represent successive clutches of a single female.

Notes on KU 220845, Tentatively Referred to  
*Macropholidus ruthveni*

KU 220845 was collected at Chaclacayo, Lima Department, Peru, 11°59'S, 76°46'W, by M. Urbina, date unknown. This locality is approximately 620 km south of the nearest known locality for *M. ruthveni* (Rio Zaña valley; see Fig. 2), but a series of specimens from Chaclacayo is apparently now available and will be reported on elsewhere by Antonio W. Salas and his colleagues (personal communication). Measurements of the KU specimen are as follows: SVL 31 mm, HL 7.21 mm, HW 4.5 mm, HD 3.25 mm, BL 15.9 mm, and TL 38 + 2 mm. Meristic counts (e.g., Table 2), the arrangement of head plates and body scales, and aspects of pattern of KU 220845 are within the range of those already reported for the types and Rio Zaña samples of *M. ruthveni*. However, the specimen is unusual in the following features: (1) the loreal scale is completely fused with the posterior nasal scale on both sides in KU 220845, whereas in all other specimens of *ruthveni* examined, the loreal is present as a discrete scale; and (2) the paired series of enlarged medial dorsal scales are incomplete and irregular on the posterior part of the body. There is a suggestion that scales of the temporal region in KU 220845 are broken up more than in the other specimens of *ruthveni*, but this difference is subtle and not reliable on the basis of the single Chaclacayo specimen we examined.

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the species of *Dipsas* are usually regarded as highly arboreal, *Dipsas oreas* at the Rio Zaña site and other sites in northwestern Peru (personal observations; see also Orcés and Almendáriz, 1987) spends its inactive diurnal period in retreats within or under surface objects on the ground, or in holes in the ground, and ascends vegetation at night. Observations on *Dipsas peruana* at several sites in southern Peru suggest a similar behavior pattern. Orcés and Almendáriz (1987) reported a clutch of seven eggs of *D. oreas* beneath decomposing humid logs in Ecuador.

The second characteristic requires further comment, as it approaches the condition in *M. ataktolepis*. The specimen has a total of 34 medial dorsal scales between the occipitals and the posterior margin of the hindlimb, which is typical for the other *ruthveni* samples (Table 2). However, each of the enlarged rows is disrupted by the intercalation of small scales. That is, neither of these rows is continuously enlarged from the occipitals to the tail base. There are 14–16 enlarged medial dorsals anteriorly, followed by additional medial dorsals of varying sizes, some approximately the same size as the “enlarged” anterior scales, others much smaller. Furthermore, the larger and smaller of these posterior scales are intermixed within each medial dorsal row and have no consistent arrangement between the two rows. This condition is similar to that in *ataktolepis*, but in available specimens of that species the size reduction occurs only once, and small scales then continue to the tail base.

Given the unusual features of KU 220845 relative to other *Macropholidus ruthveni* we have examined, we defer an opinion about the taxonomic status of this population, which is currently under study by Antonio W. Salas and his colleagues. However, in addition to being widely disjunct from the other localities known for *ruthveni*, it is worth noting that Chacacayo is about 500 m lower in elevation (889 m; Stiglich, 1922) than any other *ruthveni* localities, and the region is presently much more arid than the habitats at the other known localities for *ruthveni*.<sup>6</sup> Details microhabitat information and study of larger samples from this population should help clarify its systematic status.

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<sup>6</sup> In this context, the uncertain origin of the “Chongollapi” paratypes of *M. ruthveni* may be significant. Chongollape is a town of the coastal desert, and Noble only suspected that the paratypes came from higher, more mesic environments farther inland. We agree with this inference. Nevertheless, isolated populations of *ruthveni* or related species may exist in pockets of mesic or riparian habitats in the Peruvian coastal region. Well-documented specimens will be necessary to verify this possibility, which, in any event, we consider unlikely. However, species of the presumed closest relative of *Macropholidus*, *Pholidobolus*, inhabit mesic to xeric montane habitats in Ecuador (Montanucci, 1973:21); given the few documented localities for *M. ruthveni*, it may be premature to draw general conclusions about habitat specificity in this species.



## STATUS OF *MACROPHOLIDUS* VIS-À-VIS *PHOLIDOBOLUS*

Noble (1921a:137) noted one point of similarity (lack of prefrontal scales) and one point of difference (presence of lateral scales of reduced size in *Pholidobolus*; uninterrupted lateral scales in *Macropholidus*) between *Macropholidus* and *Pholidobolus*. Species of *Pholidobolus* described subsequent to Noble's paper (Montanucci, 1973) showed that both characters are variable within *Pholidobolus*. With the discovery of *Macropholidus ataktolepis*, prefrontal scales are now known to be variably present in *Macropholidus*. Of the 16 nonosteological/nonhemipenial features used by Montanucci (1973:31) to define *Pholidobolus*, the two species of *Macropholidus* share all but the weakly keeled to striated dorsal scales. Dorsal scales of the tail in both species of *Macropholidus* may, however, be weakly striated. We have seen neither osteological nor hemipenial material of *Macropholidus*.

*Macropholidus* is further distinguished from all species of *Pholidobolus* by the two parallel series of enlarged dorsal scales, which are foreshortened in *M. ataktolepis*, and by having a translucent disk in the lower eyelid (but this feature is present in most specimens of *Pholidobolus annectens*; Montanucci, 1973:5). The two species of *Macropholidus* are smaller than any of the described species of *Pholidobolus* (maximum SVL for the largest specimens of *M. ruthveni* and *M. ataktolepis*, both females, 45.5 mm and 39 mm, respectively; maximum SVL for females of *Pholidobolus*  $\geq 56$  mm for all species [Montanucci, 1973]).

*Macropholidus* and *Pholidobolus* share one apparently derived scutellational feature: the presence of two median rows of enlarged gular scales (Kizirian and Coloma, 1991:420; this character is shared also with *Prionodactylus*). Thus, if this feature proves indicative of a close relationship between *Pholidobolus* and *Macropholidus*, as seems likely given their shared character suites and geographical distributions (see Cadle, 1991:85–89), then the enlarged dorsal rows characteristic of *Macropholidus* may be simply autapomorphic for these two species, and *Pholidobolus* may be paraphyletic with respect to *Macropholidus* (a similar interpretation of the lower eyelid disk might be possible, pending its eventual interpretation in *P. annectens*). Phylogenetic studies of

the broader relationships among microteiids should clarify this issue.

### ACKNOWLEDGMENTS

Our work at Bosque Cachil has been facilitated and supported by Abundio Sagástegui of the Universidad Antenor Orrego de Trujillo, whose help in so many other ways is also appreciated. Several great field companions have helped us at Cachil and at Monte Seco: José Guevara, Segundo Leiva, Pedro Lezana, Raul Quiroz, José Santisteban, and Helena Siesniegas. Cadle's fieldwork at Cachil was supported by the American Philosophical Society and at the Rio Zaña by the Field Museum of Natural History; the fieldwork was also partially supported by NSF BSR 84-00166. The support of the Ministerio de Agricultura, Dirección General Forestal y de Fauna, the Museo de Historia Natural de San Marcos (Lima), and the people of Monte Seco is greatly appreciated. M. O. Dillon (FMNH) encouraged our work, shared his botanical knowledge of western Andean forests and an unpublished manuscript, and clarified some botanical information. Antonio W. Salas provided information about the Chaclacayo specimen of *M. ruthveni*. During most of the 1991 fieldwork, Cadle was accompanied by Rosa Ortiz, Camilo Diaz, and Alwyn Gentry, whose tragic early death deprived us of one of the world's great tropical biologists. E. E. Williams and M. Henzl assisted with German translations, and R. F. Inger (FMNH), C. W. Myers (AMNH), and J. E. Simmons (KU) loaned us specimens. Laszlo Meszoly prepared Figures 3 and 5. David Kizirian and an anonymous reviewer provided many useful comments that helped us clarify the manuscript.

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## NOTES ADDED IN PROOF

1. Antonio W. Salas (personal communication) provided additional details concerning the Chaclacayo (Lima Department) population of *Macropholidus ruthveni* (p. 34). Specimens are known only from an artificial forest created in association with a resort establishment by plants imported from many other places and maintained by aggressive cultivation in this otherwise arid locale. Salas believes, and we concur, that the *ruthveni* population at Chaclacayo very likely resulted from introduction with these imported plants. If so, this would remove the distributional and microenvironmental anomaly produced by the record.
2. We recently collected specimens of *M. ruthveni* (to be deposited in MCZ and in the Museo de Historia Natural de la Universidad Antenor Orrego) from the vicinity of Sangal, Cajamarca Dept., Peru, 2000 m [07°08' S, 78°50' W], approximately 48 km SE (airline distance) of the Monte Seco population of this species; the new locality represents the southernmost population known for *ruthveni*. Specimens were collected under rocks in disturbed habitats (pastures, agricultural land, and brushy hillsides). Significantly, the Sangal population is only about 30 km north across the broad, dry valley of the Rio Chilete from the only known population of *ataktolepis* at Bosque Cachil. Thus, the distributions of the two species may be parapatric at the boundary formed by the Rio Chilete, or the ranges of the two species may approximate one another at appropriate elevations around the headwaters of this river (assuming adequate habitats remain in this highly populous region). Conceivably, the two species could even be sympatric in as yet undiscovered populations in this area.